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Notice of Allowability

Application No.

09/914,375

Examiner

Aaron Roane

Applicant(s)

CRONIN, NIGEL

Art Unit

3739

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/3/2006.
2. ☒ The allowed claim(s) is/are 7-17,21,22,26,37 and 46-50.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>200604031</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Michael Reinemann (Reg. No. 38,280) on 4/3/2006.

The application has been amended as follows:

The claims have been amended in the following manner:

Claims 1-6 (Canceled).

7. (Currently Amended) An elongate microwave radiator as claimed in claim 1 for insertion into a living body to treat biological tissue at a predetermined operating frequency, the radiator comprising a monopole antenna at its tip, the monopole antenna comprising:

a monopole; and

dielectric material surrounding the monopole, the dielectric material being configured to act as a resonator at said predetermined operating frequency, and encompassing generally the whole of the near-field radiation emitted by the monopole.

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in which the dielectric material of the monopole antenna is such that it has a dielectric constant at its core which is higher than the dielectric constant at its outer periphery, the latter being more closely matched to that of said biological tissue.

8. (Previously Presented) A radiator as claimed in claim 7 in which the dielectric material of the monopole antenna comprises an inner core and an outer layer, each of a different dielectric constant.

9. (Previously Presented) A radiator as claimed in claim 8 in which the inner core and outer layer have those dimensions that extend from the monopole of the monopole antenna, which are determined in accordance with the dielectric constant of each so that the overall dimension is a predetermined fraction of the nominal wavelength of the radiation in the dielectric.

10. (Previously Presented) A radiator as claimed in claim 9 in which the inner core and outer layer each have a dimension generally equal to a quarter of the wavelength of radiation therein.

11. (Previously Presented) A radiator as claimed in claim 8 in which the outer layer is formed with indentations in its outer surface which serve to reduce the dielectric constant in this region when the indentations are filled with other matter.

12. (Previously Presented) A radiator as claimed in claim 7 in which the dielectric constant of the dielectric material of the monopole antenna varies continuously in space over at least a part of the distance from the monopole of the monopole antenna.

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13. (Currently amended) A radiator as claimed in claim 7 + which has a tip portion that extends beyond an ~~the~~ end of the monopole of the monopole antenna.

14. (Previously presented) A radiator as claimed in claim 13 in which the tip portion is pointed to assist penetration of biological matter.

15. (Previously presented) A radiator as claimed in claim 14 in which the tip portion is composed of a different material to the dielectric material.

16. (Previously presented) A radiator as claimed in claim 13 in which the tip portion is an extension of the dielectric material and is rounded so as to support forward transmission of radiation.

17. (Previously presented) A radiator as claimed in claim 16 in which the tip portion is generally hemispherical.

Claims 18-20 (Canceled).

21. (Currently Amended) An elongate microwave radiator as claimed in claim 19 for insertion into a living body to treat biological tissue at a predetermined operating frequency, the radiator comprising a monopole antenna at its tip, the monopole antenna comprising:

a monopole; and

dielectric material surrounding the monopole, the dielectric material being configured to act as a resonator at said predetermined operating frequency, and encompassing generally the whole of the near-field radiation emitted by the monopole,

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in which the elongate device comprises a coaxial conductor with a central conductor that projects beyond outer screening of the coaxial conductor at the distal end to form the monopole of the monopole antenna, and

further including a transformer between the coaxial conductor and the dielectric material to reduce reflection of radiation back into the coaxial conductor at the boundary with the dielectric material.

22. (Previously Presented) A radiator as claimed in claim 21 in which the transformer includes a space within the coaxial conductor into which packing of the coaxial conductor can expand.

Claims 23-35 (Canceled).

36. (Currently Amended) A method ~~as claimed in claim 30~~ of coupling radiation into biological material, the radiation being generated by an applicator comprising a monopole antenna including a monopole surrounded by a dielectric body, the method comprising:

configuring the dielectric body of the monopole antenna to act as a resonator; and

selecting the dielectric constant of the body in accordance with the wavelength of the radiation in the dielectric so that generally the whole of the near-field of the radiation is encompassed by the dielectric body,

in which the dielectric constant of the dielectric body varies, and is higher at its core than its outer periphery, and the dielectric constant at its outer periphery is lower than that of the surrounding biological matter.

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37. (Currently Amended) A method ~~as claimed in claim 35~~ of coupling radiation into biological material, the radiation being generated by an applicator comprising a monopole antenna including a monopole surrounded by a dielectric body, the method comprising:

configuring the dielectric body of the monopole antenna to act as a resonator; and

selecting the dielectric constant of the body in accordance with the wavelength of the radiation in the dielectric so that generally the whole of the near-field of the radiation is encompassed by the dielectric body, in which

the dielectric constant of the body is high, but is lower than that of the biological material, and

the dielectric constant at the core is greater than the dielectric constant of the biological matter.

Claims 38-45 (Canceled).

46. (New) A radiator as claimed in claim 21 which has a tip portion that extends beyond an end of the monopole of the monopole antenna.

47. (New) A radiator as claimed in claim 46 in which the tip portion is pointed to assist penetration of biological matter.

48. (New) A radiator as claimed in claim 47 in which the tip portion is composed of a different material to the dielectric material.

49. (New) A radiator as claimed in claim 46 in which the tip portion is an extension of the dielectric material and is rounded so as to support forward transmission of radiation.

50. (New) A radiator as claimed in claim 49 in which the tip portion is generally hemispherical.

Reasons for Allowance

The following is an examiner's statement of reasons for allowance:

claims 7, 36 and 37 were previously dependent claims and objected as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 7, 36 and 37 have been rewritten in independent form including all of the limitations of the base claim and any intervening claims and are therefore allowable.

Additionally, new claims 46-50, which are the same as claims 13-17, except that the new claims depend from rewritten claim 21. No new matter is being introduced.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron Roane whose telephone number is (571) 272-4771. The examiner can normally be reached on Monday-Thursday 7AM-6PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda Dvorak can be reached on (571) 272-4764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A.R. *A.R.*
April 3, 2006

Michael Peffley
MICHAEL PEFFLEY
PRIMARY EXAMINER